

Unit 10 – Heat and Thermal Energy Sources (Ch.14) & Transfer of Energy on Earth (Ch.15)

Chapter 14.1 – Temperature and Thermal Energy

1. The _____ theory explains that all matter is composed of _____ that are in _____ motion. The more energy particles have, the _____ they move.
2. Explain how particles move differently in a gas compared to a solid.
3. Temperature is the measure of the _____ kinetic energy of all the particles in a sample of matter.
4. Particles' _____ also affects kinetic energy. The more _____ particles are, the more kinetic energy they will have.
5. There are three different major types of scales that are used to measure temperature. The one Canadians use when talking about the weather is the _____ scale, while Americans describe their weather using the _____ scale. The third scale that is commonly used, especially by scientists, is the _____ scale.
6. Explain why a balloon expands when in sunlight, but shrinks when placed in a fridge.
7. Why do a cup of boiling water and pot of boiling water have the same temperature but different thermal energies? Which one has more thermal energy?

Chapter 14.2 – Heat

1. Heat is the amount of thermal energy that _____ from an object of _____ temperature to an object of _____ temperature.
2. Heating something up means we are _____ thermal energy, while cooling something down means we are _____ thermal energy.
3. The three ways heat can be transferred are: _____, _____, and _____.
4. _____ is the transfer of thermal energy by _____ contact. The heat transfer continues between two objects until the energy content is _____.
5. Explain why the ability of gases to conduct heat is much lower than that of solids or liquids.
6. _____ is the only type of heat transfer that occurs in the absence of matter. The most important source of radiation for the Earth is the _____. Only _____ radiation, which is almost always converted to thermal energy, can affect the energy of an object. In general, _____ coloured objects are poor absorbers and emitters of radiant energy, while _____ coloured objects are good absorbers and emitters of radiant energy.
7. _____ is the transfer of heat within a fluid and with the movement of fluid from one place to another.
8. Explain how a baseboard heater heats a room by convection.
9. Materials that have a limited ability to transfer thermal energy are called _____.
10. Different substances warm and cool at _____. _____ is used to describe the amount of _____ needed to raise the temperature of 1kg of a substance 1°C. Water has a much _____ specific heat capacity than aluminum or lead.
11. Latent heat is the energy needed to change a substance from one _____ to another without changing the _____.

Chapter 14.3 – Earth's Heat Sources

1. The Earth has three distinct surface components the _____, the _____, and the _____.
2. The _____ of the Earth, made up of the ocean floors and the mountains is called the _____.
3. The thin layer of gases that surrounds the Earth is called the _____. It is composed of approximately 78% _____ gas and 21% _____. The layer of atmosphere closest to the surface is called the _____.
4. The _____ includes all the water in, on, or near the surface of the Earth, 97% of which is found in the Earth's _____, while only _____ is found in other forms such as _____.
5. Over _____% of the energy that warms the lithosphere, hydrosphere and the atmosphere comes from the _____. Of this energy _____% is reflected back into space, while 70 % is absorbed by the _____ and surface.
6. The amount of radiation that is reflected by a surface is called _____. Snow-covered areas and deserts have _____ albedos , while _____ and soils have low albedos .
7. The largest source of Earth's internal energy was produced during the planet's _____.
8. The crust of the Earth functions to _____ it from _____ energy loss.

Chapter 15.1 – Atmospheric Pressure and Influences

1. Atmospheric pressure is the pressure exerted by the mass of _____ above any point on the Earth's surface and is measured using an instrument known as a _____. Atmospheric pressure is usually reported in _____.
2. How does atmospheric pressure change as you move up through the atmosphere?
3. Explain how a mercury barometer can measure atmospheric pressure.

4. As temperature in the air increases the pressure of the air _____. Conversely, as the temperature in the air decreases the pressure in the air _____.
5. What is the difference between a low-pressure cell and a high-pressure cell?
6. Isobars on a map join locations of equal _____.
7. Explain the process of radiation heating water leading to the formation of clouds.
8. If cold air sinks to the surface and warm air rises away from it, why it is colder at higher altitudes on the Earth's surface?

Chapter 15.2 – Energy Distribution

1. Surfaces with higher temperatures radiate more _____ energy than cooler surfaces.
2. Explain how incoming light rays strike the Earth differently at the equator than places near the poles and how this influences the difference in temperature we observe between them.

3. Explain how the Earth's orbit around the sun and the Earth's tilt bring about summer and winter seasons in the northern and southern hemispheres.

4. Explain how land and sea breezes work.

5. Describe a tornado and explain how it occurs.

Chapter 15.3 – Global Patterns of Wind and Water

1. Winds that blow in a _____ pattern over large portions of the globe are called _____ winds. These winds are caused by _____ produced by high- and low-pressure systems.
2. Explain why the trade winds circulate away from the equator towards 30°N and 30°S.

3. _____ are narrow bands of high-speed westerly winds that occur near the top of the _____. These jet streams can be a few _____ kilometers long and reach speeds as high as _____ km/h.
4. The _____ happens because of differences in ground speeds at different points on Earth that we do not feel. Someone at the equator is actually travelling at a _____ speed than someone at 60°N (even though neither person would notice it). Due to these differences in speed, fluids in the _____ are deflected _____ of their direction of travel, while objects in the southern hemisphere are deflected _____ of their direction of travel.
5. Ocean currents influence _____ patterns around the world. Tropical waters are warmed by the Sun and move towards the _____ carrying stored _____ with them. Warm waters will have _____ air above them. Warm air holds _____ water vapour than cold air, and when this warm air is pushed over the land, it can produce mild and _____ weather conditions.
6. The major force behind ocean currents is _____. They are also influenced by density differences between _____ and _____ waters.
7. _____ and conditions are greatly affected by stored _____ energy in the ocean.

Vocabulary to Know

Write a concise definition of each of these terms found in this chapter.

Albedo -

Atmospheric pressure -

Conduction -

Convection -

Coriolis effect -

High-pressure cell -

Insulators -

Isobar -

Kilopascal -

Kinetic energy -

Kinetic molecular energy -

Land breeze -

Latent heat -

Lithosphere -

Low-pressure cell -

Prevailing winds -

Radiation -

Sea breeze -

Solar radiation -

Specific heat capacity -

Temperature -

Thermal energy -

Tornado -

Troposphere -